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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/838,806	04/20/2001	Marc Schneiderman	8738/1	3517

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EXAMINER	
SHAH, NILESH R	
ART UNIT	**PAPER NUMBER**
2127	

DATE MAILED: 08/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/838,806	SCHNEIDERMAN, MARC
	Examiner	Art Unit
	Nilesh Shah	2127

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 April 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/08/01, 7/09/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-41 are presented for examination.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiffin (6,330,583) further in view of Putzolu et al (6,587,432) (hereinafter Putzolu).

4. As per claim 1, Reiffin teaches a method for providing parallel execution of computing tasks in a heterogeneous computing environment comprising: partitioning a computing task into small tasks (col. 5 lines 52-60). Reiffin does not specifically teach the use of mobile agents.

Putzolu teaches assigning the small tasks to mobile agents determining available computing hosts in the heterogeneous computing environment transferring the

mobile agents to the available computing hosts (col. 15 lines 5-9, col. 16 lines 24-38, col. 17 lines 3-6); and

executing the mobile agents at the available computing hosts using the execution code (col. 17 lines 1-6, col. 5 lines 17-28).

It would have been obvious to one skilled in the art at the time of the invention to combine the teachings of Putzolu and Reiffin because Putzolu's system of including mobile agents to distribute tasks through mobile agents would improve Reiffin's system by enhancing network mobility and communication.

5. As per claim 2, Putzolu teaches a method wherein the step of determining available computing hosts further comprises determining network latency (col. 3 lines 30-42, col. 13 lines 44-56).

6. As per claim 3, Putzolu teaches a method further comprising transferring execution code from a central server to virtual machines at the available computing hosts (col. 15 lines 5-9, col. 16 lines 24-38, col. 17 lines 3-6).

7. As per claim 4, Putzolu teaches a method wherein the step of executing the mobile agents is performed in virtual machines at the computing hosts without modification of the virtual machines (col. 19 lines 50-55, col. 4 lines 16-24, and col. 8 lines 29-40).

8. As per claim 5, Putzolu teaches a method wherein one of the small tasks is assigned to one of the mobile agents (col. 5 lines 18-27).

9. As per claim 6, Putzolu teaches a method wherein the step of transferring execution code is performed in response to a request by a mobile agent (col. 19 lines 50-55, col. 4 lines 16-24, and col. 8 lines 29-40).

10. As per claim 7, Putzolu teaches a method wherein the step of transferring execution code is performed by a web server (col. 1 lines 10- 25).

11. As per claim 8, Putzolu teaches a method further comprising monitoring execution of the mobile agents at the available computing hosts (col. 15 lines 5-9, col. 16 lines 24-38).

12. As per claim 9, Putzolu teaches a method further comprising allowing the mobile agents to collaborate over the heterogeneous computing environment as the mobile agents execute at the available computing hosts (col. 19 lines 50-55, col. 4 lines 16-24, and col. 8 lines 29-40).

13. As per claim 10, Putzolu teaches a method wherein the mobile agents are executed in real time (col. 6 lines 47-54).

14. Claim 11 is rejected based on the same rejection for claim 1 above. In addition Putzolu teaches storing real-time state information about the mobile agents as the mobile agents execute at the computing hosts (col. 6 lines 47-54).

15. As per claim 12, Putzolu teaches a method further comprising, prior to transferring the mobile agents, the steps of:
determining network latency affecting transmission of data between computing hosts (col. 2 lines 59-67); and
halting transferring of the mobile agents if network latency exceeds a threshold (col. 15 lines 5-9).

16. As per claim 13, Putzolu teaches a method further comprising, prior to transferring the mobile agents, the steps of:
monitoring utilization of the computing hosts(col. 2 lines 59-67); and
halting transferring of the mobile agents if utilization of computing hosts exceeds a threshold (col. 15 lines 5-9).

17. As per claim 14, Reiffin method for providing parallel computing comprising:
breaking a computer task into small tasks(col. 5 lines 52-60). Reiffin does not specifically teach the use of mobile agents or the use of migration.

Putzolu teaches constructing an application using at least one mobile agent (col. 20 lines 24 lines 50-52, fig.11 E);

migrating an application in a virtual machine from a primary host to a secondary host (col. 12 lines 27-39);

detecting an indication to migrate the application in response to the indication, migrating the application from the primary host to the secondary host without modifying a virtual machine (col. 11 lines 60-67, col. 16 lines 18 – 34).

18. As per claim 15, Putzolu teaches a method wherein the indication comprises an indication of network latency (col. 2 lines 59-67).

19. As per claim 16, Putzolu teaches a method the indication comprises an indication of hostile attack (col. 1 lines 25-67).

20. As per claim 17, Putzolu teaches a method wherein the hostile attack comprises hacking (col. 1 lines 25-67).

21. As per claim 18, Putzolu teaches a method wherein the indication comprises an indication of network failure (col. 1 lines 25-67).

22. As per claim 19, Putzolu teaches a method the indication comprises an indication of computer hardware failure (col. 1 lines 25-67).

23. As per claim 20, Putzolu teaches a method further comprising resuming execution of the mobile agent at the secondary host where execution was halted (col. 1 lines 25-67, col. 15 lines 5-9).

24. As per claim 21, Putzolu teaches a method wherein information about the mobile agent is used to resume execution of the mobile agent, the information about a mobile agent comprising information about an execution thread of the mobile agent as it existed at a computing host prior to being transferred to the secondary computing host, the information being reconstructed at the secondary computing host after the mobile agent is transferred to the secondary computing host (col. 18 lines 1-13, col. 4 lines 5-13).

25. As per claim 22, Putzolu teaches a method wherein the information about the mobile agent thread comprises stack trace information (col. 4 lines 5-13, col. 5 lines 19-27, col. 9 lines 59-67).

26. As per claim 23, Putzolu teaches a method wherein wherein the information about the mobile agent thread comprises state information (col. 4 lines 5-13, col. 5 lines 19-27, col. 9 lines 59-67).

27. As per claim 24, Putzolu teaches a method wherein wherein the information about the mobile agent thread further comprises state information (col. 4 lines 5-13, col. 5 lines 19-27, col. 9 lines 59-67).

28. As per claim 25, Putzolu teaches a method wherein further comprising:

continuing monitoring for another indication to migrate the application(col. 3 lines 30-42, col. 13 lines 44-56);

continuing migrating the application to other hosts(col. 12 lines 27-39).

29. Claim 26 is rejected based on the same rejection for claim 11 above. In addition Putzolu teaches means for transferring execution code from a central server to the computing resources, the computing resources receiving and executing one of the small tasks assigned to a mobile agent in the virtual machines using the execution code (col. 19 lines 50-55, col. 4 lines 16-24, and col. 8 lines 29-40).

30. As per claim 27, Putzolu teaches an apparatus further comprising a debugger for monitoring execution of the small tasks, the debugger storing stack trace and state information for each of the small tasks as each of the small tasks is executed by the computing services.

31. As per claim 28, Putzolu teaches an apparatus wherein the central server comprises a web server (col. 1 lines 12-25).

32. As per claim 29, Putzolu teaches an apparatus further comprising means for monitoring execution of the small tasks (col. 5 lines 17-28).

33. As per claim 30, Putzolu teaches an apparatus further comprising collaboration means for allowing the mobile agents to communicate and share information in real time (col. 6 lines 47-54).

34. As per claim 31, Putzolu teaches an apparatus wherein the mobile agents execute in real time (col. 6 lines 47-54).

35. As per claim 32, Putzolu teaches an apparatus further comprising storage means for storing real time state information about the mobile agents as the mobile agents execute at the computing resources (col. 6 lines 47-54).

36. As per claim 33, Putzolu teaches an apparatus further comprising:

means for monitoring execution of the mobile agents at the computing hosts (col. 5 lines 17-27); and

means for detecting over-utilization of one of the computing hosts and for issuing a warning when one of the computing hosts is over-utilized (col. 15 lines 1-8).

37. Claim 34 is rejected based on the same rejection for claim 1 and 16 above. In addition Putzolu teaches detecting an indication to migrate the mobile agent thread; and

in response to the indication, stopping execution of the mobile agent thread; and transferring the information about the mobile agent thread to a second computing host (col. 17 lines 1-7, col. 4 lines 5-13)

38. As per claim 35, Putzolu teaches a method wherein the information about the mobile agent thread comprises stack trace information (col. 4 lines 5-13, col. 5 lines 19-27, col. 9 lines 59-67).

39. As per claim 36, Putzolu teaches a method the information about the mobile agent thread comprises state information (col. 4 lines 5-13, col. 5 lines 19-27, col. 9 lines 59-67).

40. As per claim 37, Putzolu teaches a method the information about the mobile agent thread further comprises state information (col. 4 lines 5-13, col. 5 lines 19-27, col. 9 lines 59-67).

41. As per claim 38, Putzolu teaches a further comprising:

receiving the information about the mobile agent thread at the second host(col. 17 lines 1-7);

reconstructing the mobile agent thread at the second host using the information about the

mobile agent thread; and continuing processing of the mobile agent thread at the second host at a point at which execution of the thread was stopped at the first host (col. 17 lines 1-7, col. 4 lines 5-13)

42. As per claim 39, Putzolu teaches a wherein the step of transferring the information about the mobile agent thread farther comprises serializing the information about the mobile agent thread (col. 5 lines 16-25, col. 8 lines 29-40).

43. Claim 40 is rejected based on the same rejection for claim 1 above. In addition Putzolu teaches agent collaboration environment, which comprises:
a plurality of mobile agents (col. 5 lines 16-25, col. 8 lines 29-40).
providing a virtual workspace for the mobile agents (col. 13 lines 44-56), and
a registration subsystem for selectively assigning the plurality of mobile agents wherein each of the plurality of agents can share data, information(col. 14 lines 5-22, col. 15 lines 1-8). Reiffin and Putzolu do not specifically teach the use of a conference room but it would have been obvious to one skilled in the art at the time of the invention to add the feature of using Reiffin and Putzolu's system within a conference room environment in order to maximize the flexibility of the system.

44. As per claim 41, Putzolu teaches an agent collaboration environment wherein the conference room monitors and moderates communication between the plurality of mobile agents (col. 5 lines 16-25, col. 8 lines 29-40).

Conclusion

45. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nilesh Shah whose telephone number is 703-305-8105. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, meng An can be reached on 703-305-9678. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nilesh Shah
Examiner
Art Unit 2127

NS
August 5, 2004

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